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REMARKS

Claims 1-39 are pending in the application. Claims 1, 9-11, 15, 22-24, 28, and 32 are herein amended. Claims 36-39 are new.

The Applicants note with appreciation the Examiner's acknowledgement of the information disclosure statement filed in October 2004, as well as the Examiner's indication of allowable subject matter. Applicants have also made an effort to correct typographical errors in the specification, as suggested by the Examiner.

Claims 9-11, 15-27, and 32-35 were rejected under 35 U.S.C. 112, 2nd paragraph as being indefinite.

With respect to claim 9, the Applicants have amended accordingly. The Applicants note, however, their belief that one skilled in the art would understand the scope of the claim as originally written. For instance, claim 9 defines the hardness grade of the bonded abrasive tool is defined to be "between A and H on the Norton Company grade scale" (which is a hardness scale well-known in the art). In addition, the hardness grade is further defined to be at least one grade softer than that of an "otherwise identical" tool made with abrasive grains that have not been agglomerated together with an inorganic binder material. Thus, the hardness grade of the bonded abrasive tool is softer relative to an *otherwise identical tool* made with abrasive grains that have not been agglomerated together with an inorganic binder material."

With respect to claim 10, the Applicants have amended to correct the typographical error noted by the Examiner.

With respect to claim 11, the Applicants have amended to clarify based on Examiner's comments, and further note that 10 to 100 vol % of the abrasive grains in the first phase of the composite are in the form of a "mixture", and that mixture includes both "grains agglomerated together with an inorganic binder material" and "grains agglomerated together with an organic binder material." The Applicants respectfully submit that claim scope is clearly defined.

With respect to claims 15, 22-24, and 32, the Applicants have amended accordingly. The Applicants note, however, their belief that one skilled in the art would understand the scope of the claim as originally written. For instance, claim 15 defines the elastic modulus to be at least 10 % lower than the elastic modulus value of an

"otherwise identical" tool having regularly spaced abrasive grains within a three-dimensional composite. Thus, the elastic modulus is "lower" relative to an otherwise identical tool made with abrasive grains that have not been agglomerated together with an inorganic binder material."

With respect to claims 25 and 26, the Applicants have amended claim 15 accordingly, so that the ranges of claims 25 and 26 are now within that of claim 15.

Claims 1-7, 9-14, and 28-31 were rejected under 35 U.S.C. 103(a) as being unpatentable over Adefris (U.S. Patent 6,702,650).

The Applicants traverse this rejection. In addition, the Applicants have amended the claims to more distinctly define the claimed invention.

Applicants' independent **claim 1** defines a bonded abrasive tool, comprising a first phase that includes abrasive grains bonded with organic bond material and a second continuous phase within the composite thereby making the composite permeable to fluid flow via channels formed with interconnected porosity ..." Independent **claim 15** defines a bonded abrasive tool comprising abrasive grains bonded with inorganic bond material in the form of irregularly spaced clusters, and interconnected porosity between the irregularly spaced clusters thereby making the composite permeable to fluid flow via channels formed with interconnected porosity. Independent **claims 28 and 32** define methods corresponding to the tools of claims 1 and 15, respectively, that recite similar limitations.

Thus, the bonded abrasive tools recited in the Applicants' claims have a structure of interconnected porosity, making the tool permeable to fluid flow.

As discussed in the Applicants' background section (see paragraph #0022 of Applicants' specification), Adefris discloses an abrasive article made from abrasive composites, either shaped or irregular, arranged to have more than one monolayer of abrasive composites. The article may contain inter-composite porosity and intra-composite porosity. The composites include abrasive grains bonded in an inorganic or organic first matrix and the abrasive article is bonded with a second inorganic (metal or vitrified or ceramic) or organic binder material, to form an abrasive article having about 20 to 80 volume % porosity. Significantly, Adefris discloses: "The inter-composite pores within the abrasive article extend between and among the abrasive composites and any

second binder material, and can be open to the external surface of the abrasive article or can be sealed." (col. 12, lines 9-12).

Thus, Adefris discloses an abrasive tool having "sealed" or closed cell porosity (i.e., the only "open" pores in Adefris are those exposed at the external surface of the abrasive tool). Such closed porosity is demonstrated throughout Adefris (e.g., see closed pores in Adefris Figures 2, 3, 4, and 5).

Such sealed porosity is in distinct contrast to the Applicants' claimed invention, which requires "interconnected porosity" which allows the claimed composite to be permeable to fluid flow via channels formed with interconnected porosity. To this end, Adefris is teaching away from the claimed invention by disclosing "sealed" porosity, and is completely silent on permeability as well as any of the various benefits that flow therefrom.

As such, the Applicants submit that independent claims 1, 15, 28, and 32, as well as their respective dependent claims are patentably distinct over Adefris, and respectfully request the Examiner to reconsider and withdraw this rejection.

The Applicants further note that new **claims 36-39** define how the interconnected porosity may be increased through thermal-induced migration of bond material. Again in distinct contrast, Adefris discloses that the aggregates (also referred to as 'agglomerates' and 'abrasive composites' by Adefris) have minimal, if any, second binder material providing structure of the aggregate. (e.g., col. 5, lines 49-52; col. 6, lines16-20 and lines 55-59). Thus, Adefris teaches away from thermal migration of bond material into agglomerates to increase inter-agglomerate porosity, as variously recited in new claims 36-39.

Claims 1-14 and 28-31 were rejected under nonstatutory obvious-type double patenting as being unpatentable over Bonner (U.S. Patent 7,090,565).

The Applicants traverse this rejection.

As a preliminary matter, the Applicants have amended the claims to more distinctly define the claimed invention. In addition, the Applicants further believe that the originally filed claims of the present application are patentably distinct over the claims of Bonner. For example, Bonner claims a bonded abrasive tool and method for grinding, wherein the bonded abrasive tool is "characterized by a hardness grade between J and S on the Norton Company grade scale and a minimum burst speed of 6000 sfpm" (Bonner claims 1-18). These specific limitations are used in conjunction

with a "second phase" consisting of 16 to 34 vol % porosity. In contrast, the claimed invention of the present application defines, among other things, a "second phase consisting of 38-54 vol% interconnected porosity" and "a minimum burst speed of 4000 sfpm" (claims 1-14 and 28-31), and "40-68 vol% interconnected porosity between the irregularly spaced clusters" and "a minimum burst speed of 4000 sfpm" (claims 15-27 and 32-35). Significantly, note that the claimed porosity levels of Bonner do not overlap with the porosity levels of the present claimed invention. The Applicants respectfully submit that the combination of parameters such as vol% porosity and burst speed, when considered in conjunction with other recited limitations such as the various constituents that make of the tool (e.g., bond type/types and grain type/types) and desired hardness, is not trivial and various combinations may provide unexpected results.

For at least these reasons, the Applicants respectfully request the Examiner's reconsideration and withdrawal of this rejection.

Favorable action is solicited. The Examiner is kindly invited to telephone the undersigned attorney should there be any remaining issues.

Respectfully submitted,

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